

THE CLAIMS

What is claimed is:

1. A transparent substrate having at least one surface comprising, on at least one of its surfaces, an antireflection coating made of a multilayer stack comprising
5 alternating thin layers of high and low refractive indices wherein at least one of the high-index thin layers comprises titanium oxide which is modified to reduce its refractive index to a value of at most 2.40.
2. The transparent substrate of claim 1, wherein the refractive index of
10 the at least one high-index thin layer comprising titanium oxide is between 2.25 and 2.38.
3. The transparent substrate of claim 1, wherein the thin layers comprise a dielectric material, a low emissivity material, or a solar-protection coating.
- 15 4. The transparent substrate of claim 1, wherein the thin layer comprising titanium oxide is modified by incorporating nitrogen into the titanium dioxide in an amount of 1 to 20 percent.
5. The transparent substrate of claim 1, wherein the thin layer
20 comprising titanium oxide is modified by incorporating at least one dopant metal into the titanium oxide, wherein the oxide of the dopant metal has a lower refractive index than that of titanium oxide.
6. The transparent substrate of claim 5, wherein the index of refraction
25 of the dopant metal oxide is between 1.9 and 2.3.
7. The transparent substrate of claim 5, wherein the dopant metal comprises one or more of Ta, Zr, Sn, In, Zn, or Al.
- 30 8. The transparent substrate of claim 5, wherein atomic percentage of the at least one dopant metal with respect to the amount of titanium is at most 40 percent.

9. The transparent substrate of claim 1, wherein the thin layer comprising titanium oxide is modified by lowering the density of the titanium oxide thin layer to a value that is between 80 and 95 percent of the theoretical density of titanium oxide.

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10. The transparent substrate of claim 1, wherein the high-index thin layer comprising titanium oxide is a high-index multilayer comprising at least one titanium oxide layer and at least one additional high index layer, wherein the additional high index layer has a refractive index of at most 2.3.

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11. The transparent substrate of claim 10, wherein the at least one additional high index layer has a refractive index of between 1.9 and 2.2 and comprises tantalum oxide, zirconium oxide, tin oxide, indium oxide, zinc oxide; silicon nitride; or aluminum nitride.

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12. The transparent substrate of claim 10, wherein the high-index multilayer comprises two contiguous layers wherein the additional high index layer is closer to the substrate than the titanium oxide layer.

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13. The transparent substrate of claim 12, wherein the absolute value of the difference between the refractive index of the additional high index layer less the refractive index of the titanium oxide layer is between 0.1 and 0.6.

14. The transparent substrate of claim 1, wherein the low index thin layers have indices between 1.30 and 1.65 and comprise one or more of silicon oxide, aluminum oxide, aluminum oxyfluoride, aluminum fluoride, and magnesium fluoride, wherein the oxides are optionally halogenated.

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15. The transparent substrate of claim 14, wherein the thin layer of the antireflection coating most removed from the substrate is a low index layer comprising a

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SiO₂-Al₂O₃, wherein the atomic percent of aluminum with respect to silicon is from 5 to 20 percent.

16. The transparent substrate of claim 14, wherein the multilayer stack
5 comprising alternating thin layers of high and low refractive indices antireflection coating has a formula (high-index layer/low-index layer)_n, wherein n is 2 or 3.

17. The transparent substrate of claim 1, wherein at least one of the
alternating thin layers of high and low refractive index is replaced with an intermediate
10 refractive index layer having a refractive index of between 1.65 and 1.85.

18. The transparent substrate of claim 17, wherein the intermediate
refractive index layer replaces the alternating thin layer of high and low refractive index
closest to the substrate.

19. The transparent substrate of claim 17, wherein the intermediate
refractive index layer comprises silicon oxynitride; silicon oxycarbide; or a mixture of
silicon oxide and tin oxide, zinc oxide, titanium oxide, or tantalum oxide.

20. A glazing comprising the antireflection coating of claim 1.

21. The glazing of claim 20, further comprising a layer or multilayer
stack that is a solar protection layer, a heat absorbing layer, a UV protecting layer, an
antistatic layer, a low emissivity layer, a heated layer, an anti-fouling layer, a hydrophobic
25 organic layer having an anti-rain function, a hydrophilic organic layer having an anti-
fogging function, or a silvering layer.

22. The glazing of claim 21, wherein the glazing comprises extra-clear
glass or solid-tinted glass and wherein the glazing is optionally, toughened, reinforced,
30 curved, or bent.

23. The glazing of claim 21, wherein the glazing comprises a transparent polymer material.

24. The glazing of claim 22, wherein the transparent polymer material
5 comprises a polycarbonate or a polyacrylate.

25. The glazing of claim 21, adapted for use as the internal or external
glazing for buildings, to protect paintings, a motor-vehicle window, a mirror, a display
screen, a decorative glass, a shop window, a shop-counter, or a refrigerated display-cabinet.
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